X-542-65-445

NASA TM X-55341

THE TASK MANAGER

BY

WILLIAM D. CARPENTER

OCTOBER 1965

NASA — GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND

[redacted]

X-542-65-445

THE TASK MANAGER

by
William D. Carpenter

October 1965

Advanced Orbital Programming Branch
Data Systems Division

Goddard Space Flight Center
Greenbelt, Maryland

FOREWORD

The following article was written as an aid to the programmer turned task manager. The principles developed, while expressed in the jargon of programming, are general enough to be applicable to other disciplines.

THE TASK MANAGER

by

William D. Carpenter

"Management has been defined as the science of establishing proper objectives and efficiently utilizing human, material, and time resources to achieve the objectives." The real crux of this statement is "proper objectives". Without proper objectives, no plan, no matter how carefully executed, will succeed in delivering the goods. So, we ask ourselves, "How do we achieve a proper objective?" The easiest way, of course, is to set up objectives based on a set of details furnished by a sponsor. Experience has shown that we will wait a long time for such detail with the result that our contribution in the programming field will be rendered impotent and subject to criticism. The only way to guard against this potential black-eye is to seize the initiative and come up with a set of specifications which satisfy the problem sponsor and with which we can live. As applied to AOPB, it seems only reasonable that this kind of work should be performed by one man, acting as a single point of contact between the branch and the sponsor, to guarantee a continuity of effort and to avoid costly and needless duplication. Such a person we call a task manager.

Where does a task manager come from? How do we recognize him?

Well, he is usually born. He spends his childhood on the usual carefree distractions; in adolescence he chases girls; and, in early manhood he acquires an education and chases girls. After graduation he obtains that most sought after of jobs, programmer.

Then one day a swivel hipped computer catches his eye. She teases him with flashing lights and whirling tapes; she lures him on with a never ending promise of bigger and better ways to do things. She flatters him with, "If you want it done right, do it yourself".

One day our young man gets a big job which is really worthy of his talents. After all, has he not learned the computer's every caprice and mastered every technique of the programmer's art? He attacks it with gusto, only to find out

that he knows how to do the job, but simply does not have the time. He asks for people to help him. But this alone does not seem enough. He realizes that he needs something more than people; he needs the ability to get these people to do the job as well as he himself could do it if only he had the time - a potential task manager is born.

Let us examine the way a job comes to the branch. A telephone request is usually made to the branch head requesting assistance in support of a project. This phone call details little more than the name of the project, its sponsor and the rather vague request to "let the computer do it". Based on such sketchy information, no commitment can be made to undertake the job. Consequently, someone is dispatched to the sponsor to learn more details about the problem. From this meeting there emerges sufficient information to allow the branch head to make some gross estimates about the job: What kind of job is it? How large is it? What is its due date and what are the areas of responsibility? There is still little information which would allow the intelligent use of a programmer's time. The thing missing, of course, is the detailed information needed to write the program (or system). Assuming the project has branch and division approval, a task manager is assigned to discharge the obligations of the branch for the project.

The task managers job now begins in earnest. He assumes full responsibility for getting the job done. He sees to it that an abstract is written. He acts as liaison with the problem sponsor at all times so that he may direct the planning, scheduling, and reporting of all phases of the project and supervise members of the task group.

It is assumed that the task manager has the requisite technical skills. It remains to be defined how the task manager will go about his managerial duties of establishing and maintaining "proper objectives". Planning, scheduling, and reporting are the rudimentary tools which help him to do this. Let us examine each of these tools.

All projects, regardless of size, should have a written plan covering what is going to be done, how, when, and by whom; and what the foreseeable problems

may be and how they will be overcome. The task manager usually has such a plan in mind, at least informally, during all phases of the operations. The documented plan is not so much for the task manager's own use as it is a means of communicating with the project people and with members of the task group. Its initial breakdown sets the stage for all subsequent planning. It must be done carefully to reflect the proper level of sub-tasks without becoming a mere paper exercise. It should go only so deep as to reflect the slippage expected in the schedule caused by fluctuations in project requirements as work progresses. This will avoid misunderstandings toward the end of the project if the work is not deliverable on the date originally set.

Programming, for example, should be broken up into its component parts of system description, flow charts, coding, and check-out to reflect where the real delay lies instead of allowing the project people to point an accusing finger at that ol' devil, programming. While on the subject of depth of planning, experience has shown that the following breakdown into major milestones is helpful:

1. Abstract - This is prepared by a task manager or senior programmer based on initial discussions with the project manager. It contains a brief statement about the nature of the problem and its magnitude; it defines areas of responsibilities and interfaces, and lists due dates. The abstract allows the branch chief and the division office to assess our capability to undertake the job.

2. System Analysis and Design - This is performed by the task manager or senior programmer. It defines "what" the job is, "how" it is to be solved (both from hardware and software points of view), and outlines any foreseeable problem areas together with any suggested courses of action. The analysis should contain a title and brief description for each task and sub-task as an aid to communication.

3. System Description - This is prepared by a senior programmer and is the implementation of the system analysis and design to produce detailed specifications, right down to the level of describing the I/O, operating notes and all interfaces.

4. Flow Charting - This is prepared by a senior programmer. It is a schematic of the system description.

5. Coding - This is performed by a group of junior programmers and produces the software package which delivers the goods.

6. Check-out - This phase is performed by senior and junior programmers. It checks out step 3 to see if what was specified was actually programmed.

7. Simulation - This function is performed by the task manager and senior programmers. It is a certification of step 2, meaning it checks the system to see that it does the job requested by the project manager.

8. Documentation - This function is performed by a technical writer, usuall by contract under the direction of the task manager.

When all milestones have been completed the system is ready to be turned over to an operational group. The task manager's job is complete.

It will be noted that the above milestones reflect two kinds of planning: top-down planning represented by the abstract and bottom-up planning represented by Systems Analysis and Design. The first, or top-down planning, is more likely be influenced by the authority and responsibilities of functional management tha by the needs and requirements of the project. Management says, "Do this or that." or "Here are the project goals and requirements. Put them on the computer." Bottom-up planning on the other hand determines if it is possible to actually do this or that; it decides if it is feasible within the constraints of hard ware and software. Bottom-up planning sees to it that jobs essential to the project get done and foresee any stumbling blocks that may prevent this.

In order for this two-way planning to work most effectively the task manag must be a real contributor to the plan as well as a contributor to the actual work; in short, he makes things happen. He must clearly portray the objective of the project to team members; he must communicate fully and clearly with project management. A constant awareness of the end product, combined with clearly defined and clearly assigned task and sub-task objectives are the prim keys to tapping the full potential of the project team.

In the area of research and development associated with project work, changes in depth and scope of planning are inevitable. Therefore, the task manager will find it necessary to review and update plans frequently and to

build a flexible plan. A flexible scheduling and reporting system has been designed to implement this. It is intended to be concise and easy to fill out; it should give the task manager and the branch chief a quick evaluation of the status of the project, should pinpoint trouble spots early, and should form a pool of information from which a timely report may be written to satisfy every request made by the division office and by the project management.

The instruments recommended for scheduling and reporting are:

1 & 2. The Abstract and System Analysis and Design, previously described.

3. The Task Schedule should list at a minimum the major milestones mentioned earlier for each task and sub-task included in the System Analysis. Other tasks may be listed; however, discretion should be used to avoid trivia which would tend to obscure the purpose of the schedule.

4. Machine Time Budget reflects the amount and schedule of machine time necessary to support the effort.

5. The Task Report should be submitted for every item on the schedule. These should be filled out by the person working on the particular item with the approval of the task manager. The task manager should supply a similar report which reflects the status of the overall project with particular attention being paid to potential trouble spots.

It is absolutely necessary for a viable reporting system that the task manager be on time with his own reports and those of his task group. This is so important in fact, that all work should be suspended on the project until the milestone reports are completed. Under no circumstances should a report be delayed, even for so much as a single day, in hopes of reporting an additional accomplishment. Let it wait for the next period. The task manager should keep a log of milestone dates so that he requires no dunning from the branch chief for a tardy report.

It is hoped that this paper has cast some light on the "proper objectives" of management. The material and time resources mentioned in our definition are largely dictated by the magnitude of the job and its competition with other jobs at the Center. Contract support in terms of both computer time and programmer time are an un-tapped resource at the disposal of the task manager.

The area of utilization of humans was omitted from the discussion as being outside the scope of this paper. A few words, however, are in order. The task manager should take the true measure of his team members in estimating the group's ability to do a job. A pie-in-the-sky approach which rates all persons at the top of the spectrum of competence holds only surprises and disappointments for the task manager. The field of group leadership offers a new challenge to the task manager which, if he masters it, will extend his ability to handle larger jobs and will lead him to say, "If you want it done right, get others to do it".

BIBLIOGRAPHY

Baumgartner, John S., "Project Management", R. D. Irwin, Inc.

Karger, Delmar W. and Murdick, Robert G., "Managing Engineering and Research", The Industrial Press.

Roman, Daniel D., "Project Management Recognizes R&D Performance", Academy of Management Journal, V. 7-1 Mar. '64.

Odiorne, G. S., "How Managers Make Things Happen", Prentice-Hall, Inc. Englewood Cliffs, N. J., 1961.

build a flexible plan. A flexible scheduling and reporting system has been designed to implement this. It is intended to be concise and easy to fill out; it should give the task manager and the branch chief a quick evaluation of the status of the project, should pinpoint trouble spots early, and should form a pool of information from which a timely report may be written to satisfy every request made by the division office and by the project management.

The instruments recommended for scheduling and reporting are:

1 & 2. The Abstract and System Analysis and Design, previously described.

3. The Task Schedule should list at a minimum the major milestones mentioned earlier for each task and sub-task included in the System Analysis. Other tasks may be listed; however, discretion should be used to avoid trivia which would tend to obscure the purpose of the schedule.

4. Machine Time Budget reflects the amount and schedule of machine time necessary to support the effort.

5. The Task Report should be submitted for every item on the schedule. These should be filled out by the person working on the particular item with the approval of the task manager. The task manager should supply a similar report which reflects the status of the overall project with particular attention being paid to potential trouble spots.

It is absolutely necessary for a viable reporting system that the task manager be on time with his own reports and those of his task group. This is so important in fact, that all work should be suspended on the project until the milestone reports are completed. Under no circumstances should a report be delayed, even for so much as a single day, in hopes of reporting an additional accomplishment. Let it wait for the next period. The task manager should keep a log of milestone dates so that he requires no dunning from the branch chief for a tardy report.

It is hoped that this paper has cast some light on the "proper objectives" of management. The material and time resources mentioned in our definition are largely dictated by the magnitude of the job and its competition with other jobs at the Center. Contract support in terms of both computer time and programmer time are an un-tapped resource at the disposal of the task manager.

The area of utilization of humans was omitted from the discussion as being outside the scope of this paper. A few words, however, are in order. The task manager should take the true measure of his team members in estimating the group's ability to do a job. A pie-in-the-sky approach which rates all persons at the top of the spectrum of competence holds only surprises and disappointments for the task manager. The field of group leadership offers a new challenge to the task manager which, if he masters it, will extend his ability to handle larger jobs and will lead him to say, "If you want it done right, get others to do it".

BIBLIOGRAPHY

Baumgartner, John S., "Project Management", R. D. Irwin, Inc.

Karger, Delmar W. and Murdick, Robert G., "Managing Engineering and Research", The Industrial Press.

Roman, Daniel D., "Project Management Recognizes R&D Performance", Academy of Management Journal, V. 7-1 Mar. '64.

Odiorne, G. S., "How Managers Make Things Happen", Prentice-Hall, Inc. Englewood Cliffs, N. J., 1961.

The area of utilization of humans was omitted from the discussion as being outside the scope of this paper. A few words, however, are in order. The task manager should take the true measure of his team members in estimating the group's ability to do a job. A pie-in-the-sky approach which rates all persons at the top of the spectrum of competence holds only surprises and disappointments for the task manager. The field of group leadership offers a new challenge to the task manager which, if he masters it, will extend his ability to handle larger jobs and will lead him to say, "If you want it done right, get others to do it".

BIBLIOGRAPHY

Baumgartner, John S., "Project Management", R. D. Irwin, Inc.

Karger, Delmar W. and Murdick, Robert G., "Managing Engineering and Research", The Industrial Press.

Roman, Daniel D., "Project Management Recognizes R&D Performance", Academy of Management Journal, V. 7-1 Mar. '64.

Odiorne, G. S., "How Managers Make Things Happen", Prentice-Hall, Inc. Englewood Cliffs, N. J., 1961.

Advanced Orbital Programming Branch, Code 542

Goddard Space Flight Center

Abstract

IDENTIFICATION

(for branch use)

1. From: Date:

2. For Sponsor: , code: Initials_____

3. Brief Statement of Problem:

4. Manhours required: 5. Date due:

6. Comments:

Approved by section:_____, branch:_____

Advanced Orbital Programming Branch, Code 542

Goddard Space Flight Center

System Analysis and Design

IDENTIFICATION

1. From: 2. Date:

3. For Sponsor: code: 4. Initials:_____

ADVANCED ORBITAL PROGRAMMING BRANCH
SCHEDULE

IDENTIFIER

TASK MGR _____ SECTION _____

TASK SUPPORT ACTIVITY		JAN 65					FEB 65				MAR 65				APR 65				MAY 65					JUNE 65				JULY 65				
		2	9	16	23	30	6	13	20	27	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24	31
1	A																															
	P																															
2	A																															
	P																															
3	A																															
	P																															
4	A																															
	P																															
5	A																															
	P																															
6	A																															
	P																															
7	A																															
	P																															
8	A																															
	P																															
9	A																															
	P																															
10	A																															
	P																															
11	A																															
	P																															
12	A																															
	P																															
13	A																															
	P																															
14	A																															
	P																															

540-77

MACHINE ____________

ADVANCED ORBITAL PROGRAMMING BRANCH
MACHINE TIME BUDGET
IN HOURS AND MINUTES PER DAY

IDENTIFIER

TASK MGR. ____________ SECTION ____________ DATE ____________

AMOUNT OF TIME REQUIRED

MONTH																																																	
DATE																																																	
DAY	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
8:00																																																	
7:45																																																	
7:30																																																	
7:15																																																	
7:00																																																	
6:45																																																	
6:30																																																	
6:15																																																	
6:00																																																	
5:45																																																	
5:30																																																	
5:15																																																	
5:00																																																	
4:45																																																	
4:30																																																	
4:15																																																	
4:00																																																	
3:45																																																	
3:30																																																	
3:15																																																	
3:00																																																	
2:45																																																	
2:30																																																	
2:15																																																	
2:00																																																	
1:45																																																	
1:30																																																	
1:15																																																	
1:00																																																	
0:45																																																	
0:30																																																	
0:15																																																	
0:00																																																	

Advanced Orbital Programming Branch, Code 542
Goddard Space Flight Center
Project Report

IDENTIFICATION

1. From: 2. Date:

3. Milestone Information

	Scheduled	Now Estimated	Actual
a. Total manhours required	.....	.....	.....
b. Date work begins	.....	.....	.....
c. Date of 20% completion	.....	.....	.....
d. Date of 40% completion	.....	.....	.....
e. Date of 60% completion	.....	.....	.....
f. Date of 80% completion	.....	.....	.....
g. Date of 100% completion	.....	.....	.....

4. Manhours projected for this task until next milestone: _____

5. Manhours expended on this task since last milestone: _____

6. Events since last milestone:

7. Potential Trouble Spots:

Approved by section _____, branch _____
date date